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Notes on Foot-and-Mouth and Other Diseases with Somewhat Similar Lesions.

By WM. WOODS, F.R.C.V.S., Wigan.

(Presented to the Lancashire V.M.A.)

Mr. President and Gentlemen,—I am sorry one of the permanent officers of the Ministry has not been prevailed upon to open this discussion on foot-and-mouth disease, because, after several weeks intimate acquaintance with four of them, I can say with conviction that, at any rate, so far as foot-and-mouth disease is concerned, they are absolute experts, and also in the differentiation of foot-and-mouth from other affections which have some resemblance to it.

Perhaps the remark most often made to me during my visits to the various outbreaks and my interviews with Medical Officers, other Corporation officials, and the man in the street generally, was, what a dreadfully fatal disease this must be if it is necessary to slaughter and cremate all the diseased animals, and also to slaughter all that have been in contact, and they are bewildered when the reply is made that foot-and-mouth disease is a very mild disease, that not one per cent. would die if properly treated and that, in most cases, in from three weeks to a month the recovery would be so complete that only an expert could detect that the victims had ever had it. And yet the explanation for the policy of slaughter is a very simple one, and it is this. In the outbreaks of the eighties, when we never thought of slaughtering, it was computed and generally agreed to as a fair statement that what with occasional deaths, the loss of flesh during the week to a fortnight when the state of her mouth compelled the cow to live on gruel and slops, and in milch cows, especially where the udder or teats were affected, the fact that in a large proportion of cases these animals did not come back to their full flow of milk, it was, I repeat, generally agreed that on an average each cow lost one-third of her value. There are in this country two-and-a-half million milking cows, and if the disease were allowed to run loose it is a low estimate to state that at least one million of these would become affected. Now, if you take the average value of milking cows at £30 a head, not, I think you will agree, an extravagant figure, that means there is an average loss of £10 per head on one million cows, or ten million pounds in all. It therefore becomes merely a question of economy—whether it is cheaper to stamp it out at a cost of one million pounds, or let it run loose at a cost of ten millions.

Now as to the disease itself. So far as this country is concerned it may be described as affecting the ox tribe, sheep, goats and pigs, and I think we must include human beings in rare instances.

The virus is in the greatest concentration in the contents of the vesicles, the milk is also infective, and, owing to the possible presence of vesicles in the stomach and bowels and the swallowing of the saliva the whole alimentary tract and its contents are a dangerous source of infection. The first symptom is certainly a rise of temperature, which in cattle in a virulent outbreak such as this has shown itself, may run up to 106 or 107 degrees. It does not as a rule remain high for many hours; indeed, on the vesicles bursting, it will usually come down nearly to normal. Concurrently with this high temperature in cattle, there is generally noticed a lifting of first one hind foot and then the other, accompanied by a characteristic shaking of the foot as if trying to shake something out of it. Somewhat similar movements are often observed also in the fore feet. This is usually accompanied or very shortly followed by a dripping of saliva from the mouth and a peculiar kissing sound due to the animal sucking at the forming or ruptured vesicle. If a milch cow, these symptoms may be followed, perhaps after two or three days, by the formation of vesicles on the teats or even on the udder itself. In the cow both mouth and feet are nearly always affected, and in the mouth the inside of the upper lip and the tongue are the commonest seats. It is also not at all uncommon to see vesicles on the mucous membrane inside the nostrils. The appearance of the unbroken vesicle on the tongue is well illustrated in the accompanying photographs (shown); the surface is raised, and the thick, whiter than normal, mucous membrane, looks as if it had been boiled. These blisters are easily burst and a very little traction will peel the tongue of a piece of mucous membrane the size of a penny, leaving a red raw surface underneath. The vesicles contain a clear, slightly straw-coloured serum, and the papillæ come away along with the mucous membrane. Healing is usually very rapid and takes place from the bottom and in about a week, as shown in the second photograph, new papillæ are beginning to grow. In the pig I think I may assert that it never misses the feet, though it often escapes the mouth; indeed, in pigs the vesicles are more often in the nose than the mouth. In sheep I should say the same, except that the percentage of mouth lesions is much higher and the mouth lesions are principally confined to the dental pad.

The cause of the disease is an ultra visible virus of which very little is known. The period of incubation is rarely over four days, though instances are recorded of ten days, but personally I should search most carefully for some more recent origin before I should accept a cause ten days' old. Freezing will not kill the virus, but a temperature of 65 degrees centigrade completely destroys it. This means that infected milk does not even require boiling, either of the methods of pasteurization being quite sufficient to render it innocuous. As to the origin of the recent outbreaks the evidence seems to point strongly to its having been landed on the north-east coast of England, from whence it spread like a fan northwards into Scotland, westwards into Westmoreland, whither it travelled south into Lancashire and Cheshire and the adjoining counties. From the east coast it reached the large York market, from where it was distributed down the east coast to the south. Without dogmatising on the subject I should say that it was never carried far by the air, boots and clothing; I consider the commonest method to be through dogs, cats, hares, rabbits and sometimes birds—anything, in fact, that could carry the saliva or the contents of the vesicles on their feet. Another possible source of danger is provender sacks, an empty sack being quite commonly used by farmers to throw over the back of a sick cow. How soon the disease becomes infectious I am unable to say, but I feel certain it can be conveyed before the formation of vesicles takes place. It is extraordinary the speed with which it will spread, one cow showing symptoms one day and perhaps half the cows in the same shippon showing distinct lesions within 24 hours. An early diagnosis is of immense importance, and the want of this has occasionally accounted for its spread. Veterinary surgeons were blamed for not recognising it early, but in this connection it should be remembered that not ten per cent of the veterinary surgeons of this country of less than 30 years' experience had ever seen a case, and some of them no doubt hesitated longer than was wise before reporting.

Personally, I think it would be a good thing if the Ministry would allow any veterinary surgeon, suitably clad, to accompany their Inspectors to an outbreak and familiarise themselves with the appearances of the disease. The present method of dealing with infected carcases by either burial or cremation I consider unnecessarily wasteful. In the eighties we destroyed the head and feet and offal, and the rest of the carcase went for food and no harm resulted, and there is no doubt but that in this outbreak, numbers of animals in the incubative stage must have been consumed by human beings without any damage to anyone, and so far as pigs are concerned after they have been scalded and the horny toes removed no one can distinguish between the affected and non-affected carcases.

The disinfection of infected premises after slaughter has been of a most drastic nature and must have cost some thousands of pounds, but in the present state of our knowledge I do not see how it could be avoided. When you pay £1,000 in compensation it is poor policy to stop at the £30 or £40 necessary for efficient disinfection, and I understand that after complete disinfection the cowsheds are to remain empty for several weeks. All this seems rather excessive, and no doubt it is, but it is a big responsibility to declare even disinfected premises safe for re-stocking. Not enough is known as to how long the disease will live on empty premises. I understand that after three weeks a manure heap becomes non-infective, and I am told that in India leaving a cowshed empty for a week is considered sufficient without any disinfection whatever. Conditions in India, however, are not comparable with ours. I do not anticipate any trouble from re-stocking after the slaughtering out process has been adopted, but I candidly confess that in those outbreaks where isolation has been the policy, I think it would be wise, before declaring a place free, to buy half-a-dozen young pigs, and let them wander all over the premises for a week, for fear there may exist such things as carriers long after the disease has apparently been cured.

Just one more remark before approaching the subject of allied affections. One attack of foot-and-mouth disease is only protective against a second attack for a very short time. In South America it is reported that the disease frequently occurs twice in the same herd within a year.

Allied Diseases.

(i.) *Vesicular Stomatitis.*—This is very similar, but the vesicles point in the centre and have a turbid instead of a clear limpid fluid and they leave a circular raw surface and not a rugged surface as in foot-and-mouth disease. Vesicular stomatitis fills up from the edges; foot-and-mouth disease from the bottom. In vesicular stomatitis you may have champing of the mouth, but the sound is somewhat different.

(ii.) *Actinomycosis.*—Here you get ulceration with a yellow base. Its onset is slow, and you often find wooden tongue. The microscope is decisive in case of doubt.

(iii.) *Actino-bacillosis.*—Here there is ulceration, generally confined to the hard palate; this structure itself is inflamed and purple as if the whole were septic. It is said there is sometimes champing, but in the cases I have seen there have been continual movements of the half-open mouth, but an entire absence of noise, and the tongue is easily handled and examined, which is not the case in foot-and-mouth.

The photograph shown was taken by Mr. Bennett, M.R.C.V.S., of Leigh, Lancashire, from a reported case which we investigated together. It shows extensive ulceration of the hard palate with a perfectly healthy tongue.

(iv.) *Foul in the foot.*—This, in a mild case, and occurring just between the toes at the coronet, may be somewhat suspicious of a ruptured vesicle.

Perhaps the remark of a farmer's wife at one foot-and-mouth outbreak where I pointed out to the farmer that it must have been present several days before he had reported, and where his explanation was that

he thought it was foul, is quite a good description of the difference. She replied, "I told them it was not foul, it did not smell like it." There you have it, foul is a necrosis with a necrotic smell; foot-and-mouth has no smell.

(v.) *Armagh disease* or *dirty tongue.*—Here there is a raised condition of the epithelium on the tongue, but it is ringed like an onion and it can be peeled off in a thin layer, and if this thin layer be held up to the light it is like a gas mantle or fine lace. It is supposed to be due to some vegetable fungus.

(vi.) *Malignant Catarrhal Fever.*—In this there is champing of the mouth and vesicles on the dental pad which rupture readily and heal readily, but the animal is very ill and will probably die in a couple of days. In malignant catarrhal fever you have inflammation of all the mucous membranes of the nose and mouth with a peculiar salmon colour. This is supposed to be due to a pasteurella. It is often seen in Devon and Cornwall and often proceeds to necrosis and death. The feet may be affected, but if so it is a necrosis between the digits.

(vii.) *Pustular Dermatitis in Sheep.*—The regions affected are round the outside of the mouth and round the feet and up the legs, but these are pustules.

Finally, I wish to offer my meed of praise to the Ministry for their phenomenal success in dealing with this extensive invasion. I candidly confess that if I had been faced with the responsibility of advising the government, my advice would have been a counsel of despair, and if anyone had told me that it was possible practically to stamp it out (over a thousand outbreaks remember, in two months) I should have doubted his sanity. However, it has been done, and if only the Government will not weaken in the policy of slaughter, the invasion will soon have passed into history, along, no doubt, with gratitude to our profession, whose successful efforts deserve to be long remembered.

I do not for a moment pretend that this paper is anything more than an introduction of the subject, but I think I have said enough to form a basis for discussion. I think, too, we might include in the discussion the consideration of what preventive measures could be suggested to reduce the probability of a similar invasion in the future.

The photographs, with the one exception mentioned, have been taken by Mr. Little, M.R.C.V.S., of the Irish Department of Agriculture, whose kindness I wish to acknowledge.

Discussion.

Mr. J. D. Whitehead, F.R.C.V.S., referring to the spread of the disease said, I understand that about January 24th, foot-and-mouth disease was discovered, and somewhere about the 30th a large area was scheduled. On the 25th of the same month there was a very severe frost, and I am aware that many railway trucks passed from market to market without being cleansed. I am afraid trucks not thoroughly cleansed were being used throughout the country, and I agree with Mr. Woods most heartily that this cleansing of cattle trucks is not efficiently done.

Mr. Woods raised the question of efficient inspection of markets, saying, "I do not care how many veterinary inspectors a Corporation put in charge of a market, until they give officials or markets more power than they have at present, it is putting too much responsibility upon them. The officials at the ports have power to withhold all movements of cattle until they have finished their inspection, and therefore they can satisfy themselves that they have inspected every animal, but in a market with hundreds of cattle constantly moving about it is impossible for an inspector to be sure he has seen every animal."

Mr. E. J. Burndred, M.R.C.V.S., thanked Mr. Woods for his timely introduction of a discussion on foot-and-mouth disease. He supported Mr. Woods very strongly with regard to the question of the salvage of these animals.

As regards the cleansing of railway trucks, most of them in the past had been a little careless with regard to that part of their work, and he agreed with Mr. Woods that that was a matter of great importance.

Mr. J. Hall, M.R.C.V.S., did not think it was possible for anyone, having seen cases of foot-and-mouth disease and understanding it, possibly to mistake foot-and-mouth disease for any of the diseases which Mr. Woods had mentioned.

Continuing, Mr. Hall said: "I wanted particularly to raise the point with regard to slaughter. The reason that is put forward for adopting the method of slaughter of all affected animals is economy. I do not accept Mr. Wood's method of apportioning expense. It is very unlikely, I say, that the cost to the country would be ten millions of pounds if the disease was permitted, as Mr. Woods has said, to run loose. It is very unlikely that it would cost that amount, for this reason: if the slaughtering order was not in existence, affected herds would be at once placed under the care of a veterinary surgeon. I say that it is distinctly controllable in that way. The placing of an affected herd under the care of a veterinary surgeon is likely to lead to preventive measures being properly and thoroughly applied and also therapeutic measures. It is quite true that, as Mr. Woods says, it is the least fatal of all diseases.

"I think also, the slaughtering order should be withdrawn and the veterinary profession placed in that position to which it is entitled. I, personally, protest against it, and I say that the purely "economic" point of view should not be allowed to place the whole of our profession in the hopeless position in which it finds itself.

"With regard to the carcases of infected animals being utilized for human food. Is there any authentic case of this disease being communicated to the human being? It seems to me, with all this contact on the part of human beings with the disease, drinking the milk from infected animals before the report is made, that there would be cases, and quite a number of authentic cases, if it was a communicable disease to man. I have had considerable experience of foot-and-mouth disease, and I have never known that it was communicable to human beings."

Mr. G. C. Lancaster, F.R.C.V.S., stated that he had heard on the previous day about a farm in the West Riding of Yorkshire where there were eight cows in an infected shippon which had not contracted the disease.

Mr. E. H. Stent, M.R.C.V.S., thanked Mr. Woods for his very clear and interesting paper, particularly with

regard to the diseases similating foot-and-mouth. It was to be hoped that the outbreak which had occurred would stir the Government up to making grants for research work in that country, work which had been sadly neglected for many years.

Mr. J. H. Wright, M.R.C.V.S., congratulated Mr. Woods upon his very interesting and, at this juncture, especially important paper. He would like to know whether it was possible that the importation of foreign dogs into that country might be the means of importing that disease. There had been a great craze for the importation of the Alsatian sheep dog, and he was wondering whether it had ever been thought that these dogs had been the carriers of the disease.

Mr. Wm. Woods, in reply, expressed himself as more than pleased with the discussion that had taken place on that important subject, and continued:—

"I do not personally know of any authentic cases of this disease being communicated to the human being, but I know there are three of the inspectors of the Ministry of Agriculture who have all been stated to have suffered from foot-and-mouth disease. I have not seen a human being affected. I think the evidence is too strong to say that they have never been affected.

"In reply to Mr. Lancaster, who says in one cowshed eight cows have not suffered from foot-and-mouth disease, my experience (unfortunately, going back long ago) is this, that after the outbreaks in the eighties, a farmer would say to you 'that cow did not have foot-and-mouth disease.' They would show you the odd cow which did not have it. I certainly think more than 90 per cent. of cattle in an affected area would have foot -and-mouth disease if you allowed it to run loose. I think it is the most contagious disease of which I know.

"I doubt whether with large quantities of cattle you can have efficient inspection of markets. I was referring to the fact that there are scores of markets in this country where there is no inspection at all.

"Anything can bring foot-and-mouth disease on its feet. I should not think it likely that foreign dogs are the means of importing this disease, because they would ne placed in quarantine at the port for a certain length of time. I do, however, see a danger in the horsemeat business where the horse dealers go to Belgium and stand in the cattle markets.

"The practice of disinfecting railway trucks by whitewashing over dirt cannot be considered as satisfactory disinfection."

Notes on the Ureters, Bladder and Urethra of the Male Cat.

By B. Gorton, M.R.C.V.S., M.P.S.

Though the cat is a very common domestic animal, there is an extremely small amount of information concerning its anatomy to be obtained from books written in English. The great Chauveau, of course, studied this animal, and in the translations of his work a considerable number of characteristic points are mentioned. Another book which deals with the cat is by Mivart, but this book is general rather than particular in its statements.

Montané and Bourdille, professors of anatomy at Toulouse and Alfort respectively, have promised a volume dealing with the anatomy of the dog, cat and rabbit. This will be the fourth volume of a series of books devoted to the regional anatomy of the domestic animals. If this volume dealing with the small animals upholds the standard of its predecessors it will be a valuable addition to the literature of this subject. It is much to be regretted that Professor Montané has not lived to see the successful finish of his labours, as he died during the preparation of the part on ruminants.

Under these circumstances it cannot be out of place to record the following points with regard to the anatomy of part of the uro-genital system of the male cat.

The Ureters.—These structures, right and left, differ considerably from one another in their course from the kidneys to the bladder. The course of the left is directly backwards along the ventral aspect of the psoas muscles to the neck of the bladder. On leaving the hilus of the kidney it is dorsal to the vena cava. It passes between this vessel and the aorta to reach the ventral aspect of the former. This it gradually leaves as it runs towards the pelvis, until it lies on the ventral aspect of the right psoas muscles, which it follows to the bladder. Neither of the ureters enters the pelvic cavity, as the urinary bladder is entirely in the abdomen.

The Urinary Bladder.—The bladder, when contracted, is a rather dense pyriform mass a little more than an inch long, lying on the floor of the abdominal cavity and separated from the anterior edge of the pubes by the space of an inch or so. Thus it is seen that the bladder of this animal is further forward in the abdomen than it is in the other animals. The peritoneum forms a complete coat to this organ and also covers a considerable part of the urethra. On either side there is usually a large mass of fat.

If a longitudinal incision is made along the ventral aspect of the bladder and the interior is viewed, the openings of the two ureters are seen above and the urethral orifice below. These orifices are at the three angles of a triangular area of smooth mucous membrane, the "trigone." From each ureteral opening a ridge of mucous membrane runs towards the urethra. The two ridges join just within the urethra or neck of the bladder to form the urethral crest, the termination of which willl be seen later.

The Urethra.—In the male the urethra is very long. It measures about three and a half inches from its origin at the neck of the bladder to its termination at the free extremity of the penis. This is quite an extraordinary length for so small an animal and it is due chiefly to the forward position of the bladder. It may be divided into three parts. The first part is abdominal in position, a little over an inch long, between the bladder and the pelvic brim. It is similar to the urethra of the female, being a simple mucous tube and might be looked upon as constricted portion of the bladder. It is not embraced in any way by the prostate, which is within the pelvis. In

retention of the urine it is the length of this part of the urethra that enables the bladder to take up the position in which it is usually found in this condition, that is, in the middle of the abdominal floor.

The second part lies on the floor of the pelvic cavity and is about an inch in length. Just within the pelvic brim it is partly covered by the small prostate gland, under which the vasa deferentia open into it. It is to be remarked that the prostate is not found at the neck of the bladder, but about an inch and a quarter further back within the pelvis, and the vasa deferentia and ureters are widely separated from one another.

The third part is that portion contained in the penis and is a little over an inch long. The second and third parts correspond to the prostatic membranes and extra pelvic parts of the human urethra. The first part, that is, the part extending from the bladder to the pelvis, is interesting, because of its length and from the fact that it does not exist in the other animals.

On examination the interior of the first part is seen to be lined with mucous membrane similar to that of the bladder. Along its roof there is a median ridge of mucous membrane, the urethral crest, which begins at the junction of the two ridges leading from the ureteral openings, as described above, and terminates on a slight eminence, upon which open the two vasa deferentia and the ducts of the prostate. Behind this point the urethra is surrounded by erectile tissue and runs through the penis to the free extremity, where its lumen becomes much constricted. It is the narrowness of the urethra at the free extremity of the penis which causes catheterisation to be such a difficult operation in the male cat, for the remainder offers no obstacle to the passage of a small instrument.

The Penis.—This is short and inclined backward, so that this animal is retromingent. In erection it is directed forwards. The length of the penis is a little over an inch, of which less than a quarter of an inch is free. The organ is not at all obvious when in a state of rest, and this must be borne in mind by those who are about to perform castration by the usual method, or there is danger of its being injured by the knife. The free portion is covered by integument, which presents a series of conical papillæ with their apices directed backwards; and it is pointed. The summit is pierced by the very small orifice of the urethra, and it has for a foundation a very small bone.

Artificial Insemination in the Bitch.

By Henry Gray, M.R.C.V.S. (Earl's Court).

The Kennel Club, at the annual general meeting held at the Club House on March 9th, added a section denominated as "r" to Rule 13, as follows:—

"The progeny resulting from artificial fertilization of a bitch, unless notification was sent to the Secretary of the Kennel Club at the time of the performance of the operation, together with a letter from the owner of the bitch stating that he had knowledge of the act, and a certificate from a veterinary surgeon present at the operation."—(*The Kennel Gazette*, March, 1922).

For many centuries Arab horsemen practised artificial insemination on their apparently sterile mares in some form or other, but, so far as I am aware, it was not until about 1770 that this method was performed on the bitch by the Abbé Spallanzani. This author says:—

"I chose a spaniel bitch of moderate size which had before had whelps. Suspecting from certain appearances, that she would soon be in heat, I confined her in an apartment where she continued a long time, as will be seen below. For greater security that she might never be let loose, I fed her myself, and kept the key the whole time. On the thirteenth day she began to show evident signs of being in heat; the external parts of generation were livid, and a thin stream of blood flowed from them. On the twenty-third day she seemed fit for the admission of the male, and I attempted to fecundate her artificially in the following manner: A young dog of the same breed furnished me, by a spontaneous emission, with nineteen grains of seed, which were immediately injected into the matrix, by means of a small syringe introduced into the vagina. As the natural heat of the seed of animals of warm blood may be a condition necessary to render fecundation efficacious, I had taken care to give the syringe the degree of heat which man and dogs are found to possess, which is about 30° Reamur (about 100° Fahrenheit). Two days after the injection the bitch went off her heat, and in twenty days her belly appeared swollen, which induced me to set her at liberty on the twenty-sixth. Meanwhile, the swelling of the belly increased, and sixty-two days after the injection of the seed, the bitch brought forth three lively whelps, two male and one female, resembling in colour and shape not the bitch only, but the dog also from which the seed was taken." (Spallanzani, *Dissertations relative to the Natural History of Animals and Vegetables.* Translated from the Italian, Vol. II., 1784).

Others soon after repeated this experiment with equal success, but the practice did not attract much attention from dog-breeders until the late Sir Everett Millais, Bart., published, under the pseudonym "A Dog-Breeder," a note of a successful experiment he had made some months before, in the *Veterinary Journal*, 1884, Vol. XVIII., pp. 256-258; and in booklet form, entitled, "*Two Problems of Reproduction*" (Our Dogs' Publishing Co., 1896), a series of experiments in the same direction. A year later (1897) Mr. Walter Heape, of Cambridge, published a very valuable paper on "The Artificial Insemination of Mammals and subsequent Fertilization or Impregnation of the Ova," in the *Proceedings of the Royal Society of London*, Vol. LXI., Feb. 25—June 17th, 1897. It contains an excellent bibliography.

The attention of the veterinary profession was drawn to this communication by Professor J. Arthur Thomson who gave a good resumé of the essential facts in *The Veterinarian*, 1897, Vol. LXX., pp. 328-329. Later on, Mr. Walter Heape contributed

an article "On the Artificial Insemination of Mares" to *The Veterinarian*, Vol. LXXI., 1898, pp. 202-212.

Since these communications of Mr. Heape artificial insemination has rapidly grown, so now it has become as established practice in cases of apparent sterility and in many instances to widen the utility of a valuable sire. But so far as the bitch is concerned it has not made such rapid headway in general practice, in spite of the fact that it has been shown to be invaluable in the case of shy breeders, in those that have some impediment in the outer passages of the genital organs—as swelling or constriction of the lips of the vulva, or of the vagina, a pendulous or constricted or swollen cervical canal, spasmodic or paralytic action of the vagina during coitus, abnormal or excessive vaginal secretions, and other conditions.

It is probably more valuable in case of the male being unable, through lack of sexual vigour or through stupidity on his part, to penetrate the female. This latter condition is frequently seen in animals that have been denied sexual intercourse until rather advanced towards middle life; notwithstanding the desire may be great, there is lack of the instinct as to how to perform the function of copulation.

Furthermore, it is invaluable in the case of a great demand being made upon a valuable stud dog when many bitches may be inseminated artificially after one service, or the semen may, under proper precautions, be sent a distance by post or rail for artificially inseminating a bitch.

The operation should be carried out on the ninth or tenth day of œstrum, and in many instances, such as those not connected with any trouble with the cervical canal or vaginal secretions, there may be no necessity to introduce the semen directly through the cervical canal into the uterus—in the majority of instances conception will take place if the semen is injected into the vagina or even just within the vulva.

The semen may be collected with a warm sterilized syringe from the vagina of a bitch immediately after service, or in a clean and warm glass vessel during the spontaneous emission from the dog during sexual excitement. Frequently mere manipulation of the penis during sexual excitement will cause the dog to ejaculate his semen. If stored in a warm vessel and kept in the *dark* the spermatozoa will retain their vitality for twenty-four hours or longer even days, if stored in a Thermos flask or incubator. If kept at the ordinary temperature of a room during mild weather the semen may be virile at the end of twenty-four hours. It may also retain its virility when mixed with warm saline solutions, such as those of sodium chloride and sodium carbonate. Although it is better that the temperature of the collected semen should be maintained during storage at that of the animal body (100° F.—102° F.) it may yet be potent at a much lower degree, which does not always impair the viability of the spermatozoa. Light, especially sunlight, has very much more deleterious effect upon them.

Many authorities consider that the semen during coition is ejaculated into the uterus, but in the case of the bitch this seems improbable as in numerous instances of *mesalliance* irrigation of the vagina with a weak and warm solution of zinc sulphate, chinosol, or permanganate of potassium, within an hour or so of an undesired service, is sufficient to prevent conception, and it is very doubtful if any of the solution passes through the cervical canal into the uterus.

Whole kennels of bitches, like herds of cows or studs of mares often become sterile or have a "broken service," for which there seems no reasonable explanation. It is, however, thought to be due to an insufficient supply of natural (raw animal) food, lack of free exercise and the presence of an abnormal vaginal secretion. The giving of raw flesh and dirty paunches, alœtic purges and vaginal irrigations with alkaline or mild antiseptic solutions just before œstrum or a day or two before service has been followed by successful conception, but whether the treatment has been the cause of the results or it is merely a coincidence one cannot say.

Besides the literature mentioned above Iwanoff has contributed a very valuable article, "*De la Fécundation artificielle chez Mammifères*," which will be found in the *Archives des Société de Biologie*, Vol. XII., 1907. In 1910, F. H. A. Marshall, Sc.D., published a volume on the *Physiology of Reproduction*, which is in reality one of comparative physiology of reproduction and affords very valuable and interesting information for the veterinary student, post-graduate, or practitioner. Mr. C. H. Huish, of 12 Red Loin Square, W.C.1., who supplies reliable inseminating syringes for all species, has compiled from veterinary, agricultural and other sources a very useful little book on "*The Causes of and Remedy for Sterility in Mares Cows, Sheep and Bitches*," which has passed through six editions.

The Spermatic Secretion and its Ultraparticles.

By Pierre A. Fish (Ithaca, N.Y.).

(Reprinted from *The Cornell Veterinarian.*)

Read before the N.Y. State Veterinary Medical Society, Buffalo, July 27th, 1921.

Of all the products of the body none has a more important or direct connection with the perpetuation of the species than the spermatic fluid. Because of the importance of its function, it may be assumed that the most select material of the body is contributed, through the blood, to its production. The sperm is further differentiated from all other secretions of the body by the remarkable activity of its cellular elements—the spermatozoa, whose rapid and apparently erratic movements are in distinct contrast to the very slow and deliberate ameboid movement of the white blood corpuscles.

B. Slovtzov[1] publishes the analysis of the sperm of the dog, horse and man, as follows:—

	Dog	*Horse*	*Man*
Water	97·550	95·705	90·321
Solids	2·450	4·295	9·679
Ash	0·687	0·915	0·901
Organic matter	1·763	3·380	8·778
Total albuminoid matter ...	1·259	2·238	2·854
Albumins, globulins, nucleo-proteins	0·886	1·142	—
Mucin	0·057	0·559	2·579
Albumoses	0·314	0·537	0·412
Lipoids	0·182	0·172	0·208

	Dog	*Horse*	*Man*
Cholesterin	0·00075	0·0042	—
Organic matter, various ...	0·312	1·090	5·716
Freezing point	0·603	0·557	0·500

Although the inorganic matter shows little variation, the organic material, while present in greater quantity than the inorganic, shows wide variations in the three types. The freezing point of the human sperm is depressed less than that of the dog, although in the former case the amount of the solids is quadrupled. Quite appreciable quantities of albumoses (an intermediate product in protein digestion) are also noted and the proportion of mucin in the secretion of man is notably higher than in either of the other two

The complexity of the spermatic secretion and its relation to enzyme action has been brought out by the introductory work of Iwanow and Andreew.[2] These investigators state that the movements of the spermatozoa in the dog are stimulated to a greater degree of activity on coming in contact with the secretion of the prostate gland than by contact with any artificial saline medium. That this activating property is due to the presence of enzymes seems to be further confirmed by the fact that when the prostatic secretion is subjected to a boiling temperature and later brought in contact with the spermatozoa it no longer has the power of accelerating their movements. The question of motility and its dependence upon some specific enzyme or enzymes in the secretion is of surpassing interest. Among the oxidizing enzymes, they have investigated tyrosinase and peroxydase and quantitatively have determined phenolase and catylase. They have found trypsin and antitrypsin and also an amylase, but the presence of pepsin and erepsin was not demonstrated. The presence of monobutyrase was also noted.

Amantea[3] has found that the total number of spermatozoa in the ejaculation of the dog has no relation to the duration of coition, the quantity of semen eliminated, nor to the size of the animal. From dogs in sexual repose the first ejaculation showed that the total number of spermatozoa varied from 38,740,000 to 679,960,000, in the single emission and the quantity of the secretion from 1·7 to 19·1 mils. He has also shown that in the normal dog after a period of sexual rest ranging from two to twelve days between sexual service that the second sample showed a much greater number of spermatozoa present (100% to 800%) than in the first sample, as if the first emission had exercised a stimulating or trophic effect upon the testicular secretion. An interesting feature of his observation was that although there were many more spermatozoa present in the second emission there was, in many instances, actually a smaller amount of the secretion to hold the spermatozoa.

Amantea[4] tested the effect of successive emissions, three or four, from the same dog during the same day, with the general result that the number of spermatozoa decreased as did the quantity of semen with each successive emission. The effect of a single emission daily was carried out upon the same dog for a period of two weeks. After the first two days there was in general a decrease of about 50 per cent. in the number of the spermatozoa, although there were fluctuations somewhat above and considerably below this percentage. The quantity of the semen did not show nearly as much fluctuation as did the spermatozoa. On occasional days there were quite as many mils as on the first two days. By regulating the period of sexual repose it is possible to increase or decrease, or keep in approximate equilibrium the number of spermatozoa and in less regular limits the quantity of semen; but the amount of the semen is no criterion as to the number of spermatozoa contained in it.

Lewis[5] has noted as many as 600,000 sperm cells per cubic millimetre or at the rate of 600,000,000 per cubic mil in the semen of a young Berkshire boar weighing 209 pounds. In a stallion during nine successive daily services the number of sperm cells per cubic millimetre dwindled from 131,750 at the first service to 5,840 at the ninth service, and the amount of the semen collected at the same services was in the first case 65 mils and in the last service only 5 mils, showing a decrease in the total number of spermatozoa from 8,563,750,000 to 29,200,000, with also a diminution in their vitality.

In another stallion with a record of eleven services in ten days, it was noted that the number of spermatozoa per cubic millimetre dropped from 232,500 at the first service to 43,000 after the eleventh service; at the sixth service as much as four ounces, or approximately 120 grams, were collected producing a grand total of approximately 7,260,000,000 spermatozoa in the ejaculation.

The spermatic secretion as evidenced by its actively motile constituents—the spermatozoa, and the presence of various enzymes and other components, doubtless to perpetuate the activity of the spermatozoa, indicates that it is probably the most complicated product of the body. To add to its complexity an examination of numerous samples of the secretion with the dark-field microscope has shown a great number of very minute particles or ultraparticles which, in the literature available to me, have not apparently been described before. Whether these particles are constantly present in the semen of all male animals under any and all conditions, it is yet too early to state. Thus far they have been found constantly present in the secretion from man, stallion, bull, boar and rooster.

A slide preparation, from perfectly fresh material, shows that the particles or spermatomicrons, apparently without Brownian movement, are imbedded in the jelly-like matrix of the semen; although the Brownian movement is often difficult to determine on account of the lashing movements of the spermatozoa which cause a trembling of the whole mass. The jelly-like consistency is followed after a short time by an apparent liquefaction of the mass, and the Brownian movement of the particles then become very pronounced. If the cover glass is sealed with a ring of oil, the Brownian movement may be observed for several days.

Quite naturally a question of interest arises in connection with the composition of the particles. A tempting and simple hypothesis would be to consider them of the same nature as the particles or chylomicrons in the blood, which Gage has shown to be dependent upon fat absorbed from the diet and which may therefore be regarded as visible fat particles. The high powered oil immersion objective with the bright-field observation is of no use, as the particles are not visible with this form of apparatus. Attempts to stain the particles with osmic acid (assuming they might be fat) have therefore resulted in failure. The application of the Babcock test, for butter fat, to a sufficient quantity of semen from a bull gave a negative result; such fat solvents as ether and chloroform also yield negative results. The evidence from the experiments thus far attempted indicate that the spermatomicrons are not composed of fat. Digestion experiments have also been tried, principally with the pancreas and its preparations, since this gland is the principal supply of the fat digesting enzyme in the body. A small portion of fresh pancreas and intestinal mucosa from a cat was mixed with some semen diluted with an equal amount of saline solution and placed in an incubator for 22 hours, with the result that all of the spermatozoa and practically all of the spermatomicrons disappeared. Although the conditions of this experiment may have been favourable to the digestion of fat, they were also quite as favourable for the digestion of protein material. Other experiments were carried on along the line of protein digestion with papain, trypsin and pepsin in addition to repeated tests with the pancreatic tissue. Although there were variable results there was a general tendency indicating that the particles were of protein material. In some cases there was a decrease or absence of both spermatomicrons and spermatozoa; in other cases there were fluctuations, sometimes one or the other of these constituents preponderating. In a number of cases very satisfactory biuret tests for peptone were obtained. Some allowance must be made for the decreased number of spermatomicrons because of the necessary dilution when the digestive fluids were added.

In certain other cases there appeared to be an increased number of particles probably due to the development of bacteria or cocci-like forms which cause more or less confusion in the results. Limited amounts of antiseptics added to these mixtures were not always effective in checking the bacterial growth. The solutions used as controls, 1 per cent. sodium carbonate and 0·2 per cent. hydrochloric acid, indicated that the constituents might be affected independently of enzyme action. With the sodium carbonate solution the spermatozoa were usually disintegrated, decreased or absent. The spermatomicrons were generally present in considerable numbers. With the 0·2 per cent. hydrochloric acid, the spermatozoa were not so noticeably affected as with the sodium carbonate, but the spermatomicrons were apparently much decreased in number, and there was no evidence of Brownian movement. The acid seemed to exert primarily a curdling action upon the semen and the spermatomicrons presented the appearance of being fixed in the mass. The acid by inhibiting the growth of many forms of bacteria has the general effect of an antiseptic and exerts an undoubted influence in keeping the number of particles down to a minimum. If the particles are of a protein nature, they may be converted into acid albumin and disappear from the mass while undergoing solution. While the spermatomicrons doubtless go into solution in the sodium carbonate also, it forms a more favourable medium for the growth of extraneous organisms. Although experience enables one to differentiate fairly accurately between the true particles and the organisms, there is not much doubt that in the hurried count of a microscopic field many of the organisms are included. The majority of the samples of semen were obtained from two bulls. The most of the samples were taken directly from the vagina of the cow just after copulation. There was thus opportunity for bacterial contamination.

The size and number of the spermatomicrons seemed to vary in the different species. In the semen of the stallion they seemed rather coarse and not very numerous—averaging from 21 to 35 in a micrometer field. In man the average was something over 100 in the same field and the particles appeared to be more minute. In the two bulls (both Guernseys) a rather constant difference was noted in the number of spermatomicrons present. With bull No. 1 it was customary to allow two services to the cow before the semen was collected. With bull No. 2 the semen was collected after one service. With bull No. 1 the average of six double services showed an average of 41 spermatomicrons per ocular micrometer field, while with bull No. 2 the average of four single services gave an average of 90 spermatomicrons per micrometer field, more than twice as many as bull No. 1. With bull No. 2 an interesting experiment was tried by counting the spermatomicrons after three successive services upon three different heifers with only a few minutes intervening. There was practically no variation, as all three were within the limits between 95 and 100 per micrometer field.

The observations have extended over a period of more than a year, but the results thus far obtained can be considered only from a preliminary standpoint. The number of the spermatomicrons present in the semen undoubtedly varies in individual cases; whether or not there may be some practical application of an increased or decreased number of these particles in connection with the fertility or sterility of the male requires considerable statistical data extending over a long period of observation.

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2. Comptes rend. Soc. de Biol., 1916, LXVIII., 85.
3. Arch. Ital. de Biologie, LXII., 37.
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Performing Animals.

SELECT COMMITTEE'S REPORT.

The Report of the Select Committee on Performing Animals, over which Brigadier-General Colvin presided, has been issued as a Parliamentary paper (89). The Committee was first appointed on July 12th, 1921, and reappointed on February 22nd, 1922, to inquire into the conditions under which performing animals are trained and exhibited, and to consider whether legislation is desirable to prohibit or regulate such training and exhibition and, if so, what lines such legislation should follow.

The Committee held twelve public meetings, at which forty-three witnesses were examined, the evidence embracing a period of about twenty-five years. They are convinced that there have been in the past, and certainly still are, many cases of ill-treatment and wanton cruelty in the training and performances of animals; but, generally speaking, there has been a marked improvement in the care and treatment of animals during recent years. The growth of the humanitarian spirit in this country will be a further safeguard to animals which perform in public. The committee are of the opinion that there are certain exhibitions and acts which are undesirable. Performances in which the animal is terrorised, or in which it incurs any risk of injury should not be permitted; and that any protection that is afforded to any classes of performing animals should be extended to animals figuring in film productions.

In their summary and recommendations the Committee state they are satisfied that certain charges of cruelty have been established, and that steps should be taken to prevent their recurrence. They are impressed with the honest and genuine desire of the profession to eliminate every possibility of cruelty and ill-treatment, and with their willingness to co-operate with the societies for the prevention of cruelty to animals in restricting performances to such as will meet with general approval. The Committee are therefore of opinion:—(1) That the exhibition of all performing animals should not be prohibited; (2) That measures should be taken for the better supervision of trainers, training establishments, and all animal performances; (3) That the penalties imposed have proved generally inadequate.

The Committee recommend:—

(*a*) That a Committee of Supervision should be appointed consisting of a chairman and four members to be appointed by the Home Secretary, two members by animal protection societies, and two members by the profession, with power to increase their number to thirteen in like proportion; that five members should constitute a quorum, or seven if the committee is enlarged; and that this Committee should have the power of prohibiting, restricting, suspending and modifying any performance or the training of animals for any specified performance or exhibition which they consider undesirable on the ground of cruelty to the animals engaged in it.

(*b*) That all persons who train animals for public exhibition or performance, and the places where they train them, should be registered.

(*c*) That a representative of the local or borough county council, the officers of the R.S.P.C.A., and the police should have access at all times, without previous notice given, to the places where animals are trained, and to any exhibition at which performing animals are engaged.

(*d*) That in view of the fact that the Committee would have no control over training abroad, the Committee should have power to prohibit the performances of animals trained abroad in those cases, where in their opinion the conditions of their training involved cruelty.

(*e*) That the training and performances of all chimpanzees and of all anthropoid apes should be prohibited.

(*f*) That the training, exhibition, and performances of all the larger carnivora (such as lions, tigers, leopards, and hyænas) should have the special attention of the Committee of Supervision.

(*g*) That the use of mechanical and other appliances in the execution of conjuring tricks which involve cruelty should be prohibited.

(*h*) That the penalties for cruelty to animals should be revised and increased.

The Veterinary Record.

10th June, 1922.

Abstracts and Reviews.

A Canine Rejuvenation Experiment.

Dr. Knud Sand communicates an interesting example of Steinach's methods, which as an isolated case he does not wish to overstress, but which seems well attested and of a striking character. In May, 1921, an acquaintance brought to him at a pathological institute in Copenhagen, a pedigree German pointer, 12¼ years old, whose life the owner despaired of owing to senile changes: he contemplated having the dog killed. Sand took the precaution of sending the animal to Professor Hansen, of the Royal Veterinary and Agricultural College of the same city, for a preliminary report. This affirmed that the dog suffered from pronounced senility, with the symptoms of dull eyes, thin coat, deafness, and thickened inelastic skin. It could move only with difficulty, was emaciated, and often had incontinence of urine and fæces. There were no signs of organic disease except cirrhotic kidney, which was almost universal in old dogs. A tuberculin test proved negative. In spite of misgiving as to whether an anæsthetic would be borne, Sand performed on May 23rd resection of the left epididymis and right sided vasectomy. The effects of the operation had been completely recovered from by June 15th. In a week's time from this, both testicles were felt to be distended, the right more so. However, very little retrogression of senility occurred, and at the end of the month the animal was returned to its owner, who, on October 25th, wrote that three or four weeks after discharge the dog became brisker, its appetite better, and its coat thicker. By the end of August it could run behind a bicycle slowly ridden and the sexual appetite revived: sight and hearing improved and it no longer slept all day. In September great strides were made, so that he again used it for sporting purposes and regarded it as equal in every way to a dog seven years old. The animal was again examined by the veterinarian already mentioned, who expressed great surprise at the change in it. The author concludes by recommending such treatment to the attention of the veterinary profession.—*The Lancet.*

New Avenues in Immunisation.

The first of the special weekly lectures on pathological research in its relation to medicine, arranged for the summer session in the Institute of Pathology and Research, St. Mary's Hospital, was delivered on April 27th by Sir Almroth Wright, who took as his subject "New Avenues in Immunisation." The lecturer gave a brief sketch of the origin and growth of the doctrine of immunity and explained how the discovery that protection could be produced by the inoculation of killed microbes or vaccines, combined with the elaboration of methods for measuring the amounts of immune bodies in the circulating blood, had opened the way for the practice of therapeutic immunisation. It is common knowledge that though this method of treatment has been brilliantly successful in many directions, in others it has been disappointing, and this is particularly so in cases of septicæmia. His experiences during the war have led Sir Almroth Wright along new lines of research and have opened up new avenues of thought. Adopting his "method of after-washes" for the measurement of the bactericidal power of the blood, he has discovered that the intravenous injection of a vaccine is immediately followed by the appearance of bactericidal substances in the blood, which are not specific, but can act upon various types of organisms. This in no way negatives the doctrine of specific immunity; for the late result of an inoculation with, say, a typhoid vaccine, is the production of antibodies which are specific for the typhoid bacillus, but the immediate result of such an inoculation is the appearance of non-specific antibodies. Inasmuch as leucocytes possess the power of inhibiting the growth of organisms on culture media, it seems likely that these non-specific substances exist ready formed in the leucocytes which yield them in response to the immediate demand. The immunity response is thus dependent upon two factors, the activity of the leucocytes and the development of specific antibodies in the serum. Estimating these two factors separately, it has been found that in many of the cases which have failed to respond to vaccine treatment the fault has been in the leucocytes. Sir Almroth Wright has therefore devised the method of immuno-transfusion; this consists in the transfusion of blood which is treated after collection from the donor with the appropriate vaccine. The methods adopted for determining the optimum amount of vaccine to be employed in this procedure were detailed, and the laboratory tests by which benefit to the patient can be demonstrated described. Finally the lecturer referred to three cases of apparently hopeless streptococcal septicæmia which he had recently treated by this method with complete success. The investigations upon which Sir Almroth Wright has been engaged since the war are of the greatest interest; they suggest entirely new conceptions of immunity to bacterial disease, and give every promise of providing means of coping with certain acute infections which have so far defied all methods of treatment.—*The Lancet.*

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases

Hæmorrhagic Septicæmia in Ewes.

By W. F. Aston, M.R.C.V.S., Ludlow.

History.—A farmer with a flock of 150 sheep, of which 86 were ewes that started to lamb about February 20th, reported deaths among the ewes which had lambed from March 3rd to 21st, when he sought professional aid. The ewes were in good order and living on a pasture of upland meadow and clover root, with a feed of roots and maize meal once a day. During the course of the disease, until the first inoculation on the 30th of March, deaths numbered 30, with another ten seriously affected cases still alive on that date.

The disease was almost entirely confined to ewes after lambing. The disease made its appearance from five to fourteen days after parturition, and the recoveries were not more than five or six; these cases being of a very mild form.

Symptoms.—Acute dejection, almost total loss of appetite, sinking eyes, with occasional cases of keratitis; temperature 101° to 105°, breathing accelerated until some few hours before death, when ewe became comatose. A brown, in mild cases greenish, fœtid, watery diarrhœa accompanied by straining. A most marked and usually first noted symptom was a greatly increased thirst, and this remained for first few days of illness.

Post-mortem.—This revealed petechial patches on endocardium and some fluid in the pericardial sac. Abomasitis was not very pronounced except in most acute cases, the liver was soft and friable, showed fatty degeneration, and was usually shrunken. A varying degree of broncho-pneumonia was present, according to the duration of the illness, which varied from 24 hours in a few cases to five and seven days; average about four days.

There was an entire absence of liver flukes in all the carcases opened, and in one which Mr. A. W. Noel Pillers kindly examined he was "unable to detect the presence of any pathogenic worms in stomach or intestines." The heart and lungs of this carcase were submitted to Dr. S. L. Ashcroft, of Liverpool, who isolated an organism, which he stated to be "morphologically and culturally identical with the organism belonging to the H.S. group." As a result of animal inoculation he confirmed this opinion.

Treatment.—During this time medicinal treatment had been attempted with no success. Prophylactic measures consisted of isolating all cases as soon as first symptoms appeared. The sheep were shut off from water for several days, but this had no effect on number of cases; accordingly grs. v. of pot. permang. per head was given in drinking water each day. The sheep drank the solution readily, and the more thirsty got a larger share, but no beneficial result accrued over an eight days' trial.

On March 30th I inoculated forty-four ewes which had lambed and were most susceptible, with Parke, Davies and Co.'s H.S. Ovine serum, giving a 20 c.c. dose (average weight of ewes 65lbs.). Of the forty-four inoculated, one was taken ill on April 3rd, and died on the 7th. Two others showed symptoms on the 2nd; both recovered, one in two days and the other in five. On March 30th I also inoculated five ailing, mostly serious, and what we regarded as previously hopeless cases, using a 30c.c. dose. Two died on third and fourth days after and other three recovered. The forty-four ewes with several others which had since lambed were re-inoculated on April 14th and 21st, and one more ewe died. Several showed symptoms for a day or two, but these may have been due to the serum. The time allowed between the first and second inoculation was too long; not more than six or seven days should elapse. There have been no further fresh cases or losses due to this disease up to May 10th.

Many of the lambs were weakly, but few contracted the disease in anything like the form shown by the ewes. There were several cases of keratitis in lambs. In spite of losing their mothers, artificial feeding, etc., the losses were not very high among these lambs.

Remarks.—It would appear that the disease is spread by contaminated food, the droppings of infected cases soiling the pastures, infection being by the intestinal tract. The initial origin is very difficult to account for, and I can offer no valid suggestion. The lay theory is that it is due to the ewes having no water in previous dry summer.

Huytra and Marek record a septicæmic affection of ewes after lambing, which was enzootic and due to a diplococcus, the lesions producing metritis and peritonitis; these lesions were not present in this outbreak.

I have heard of another outbreak in a neighbouring county which I believe the veterinary surgeon in charge treated with an autogenous vaccine. I trust that he will find time to record the result of his cases, as the literature available on the subject is scarce, and would lead one to conclude the disease was unknown in the British Isles.

Obiter Dicta.

Cow-House Construction.

By G. Mayall, M.R.C.V.S., Bolton.

I was much interested in the remarks of Mr. W. R. Davis, M.R.C.V.S., in your issue of May 20th. One likes to hear of veterinary surgeons being consulted about the construction of cow-houses, especially in view of the present revived agitation for clean milk. So little can be done to keep milk free from gross contamination in a badly-constructed cow-house and so much in one correctly and thoughtfully planned. In fact, one might at most write that the *fons et origo* of clean milk rests with the construction of the cow-house. The length of stall must have regard to the breed of cow kept. Writing generally, Kerries would do with 6ft. 10in. from the facing wall; Ayrshires about 7ft. and Shorthorns 7ft. 6in. Cross-bred cows, which comprise by far the greatest number of dairy cattle, however, are of such varied length that there is something to be written in favour of gradually varying the length of stalls in a byre and making them to come, say, 8 or 9 inches longer at one end than at the opposite end. Feeding troughs should be about 1ft. 6in. wide and 6 to 9 inches high on the side next the cows. The cow when lying down can then do so comfortably with her head over the trough. The slope recommended by Mr. Davis is very necessary, as it enables the urine to run away from the back of the cows. If there is a grip, 1 inch in 2 feet is about right for the slope. We think in all new cow-houses stanchions or American neck yokes are the best for the production of clean milk. We have been struck by the prevalence of these south of the Midlands and their absence further north. In the county of Wiltshire we saw many of them. All veterinary surgeons now-a-days should recommend them. They economise the cost of cow-house

construction and help materially to keep milk clean, while cows do well in them. Moreover, they ensure cleanliness by keeping the cows in place, *forward* when lying down, *back* when standing. Several of them are well illustrated in my book on "Cows."

Association Reports.

The Central Veterinary Society.

Interesting Exhibits.

American Meat Inspection Methods.

A meeting of the Society was held at No. 10 Red Lion Square, on Thursday, May 4th, 1922, the President, Mr. G. H. Livesey, occupying the chair.

The following Fellows signed the attendance book: Messrs. J. W. MacIntosh, A. E. Willett, P. S. Howard, W. N. Thompson, R. A. Philp, J. McCunn, R. J. Foreman, F. W. Willett, H. D. Jones, T. J. Bosworth, R. Bryden, W. Perryman, B. S. Cockerton, A. E. Payne, H. Kirk, W. S. King, G. Dunlop Martin, and J. F. Macdonald, Hon. Sec.; Cols. H. S. Mosley, A. J. Williams and Dunlop Young; Majors P. W. Dayer Smith, F. G. Hobday, and G. Dunkin.

The President introduced the visitors, of whom there was a satisfactory number: Major-General Sir John Moore; Dr. J. Wray, Veterinary Officer of the United States in Great Britain; Dr. R. M. Nighbert, of the U.S. Animal Bureau; Dr. C. N. Turner, M.O.H., Beaconsfield; Mr. J. Clunes Ross, from Australia; Mr. J. A. Griffiths, a member of the College, at present on leave from Nyasaland; Mr. A. H. Turner, Mr. C. N. Thompson, and Mr. W. Minter. There was also Mr. E. C. Squire, who would be so kind as to give the cinematograph demonstration. He offered to all these gentlemen a cordial welcome.

Correspondence.—The Hon. Secretary announced that letters regretting the inability of the writers to attend had been received from Major-General Blenkinsop, Major Simpson, Mr. Male, Col. W. A. Pallin, Mr. Stroud, and Vet. Major Rees-Mogg, who was to have read a short paper, but was in hospital. Mr. Johnson had written asking a solution of a problem. Mr. Buxton had acknowledged receipt of Capt. Kirk's resolution, and stated that a committee had been appointed to consider the subject.

Morbid Specimens.

Lieut.-Col. H. S. Mosley showed a renal calculus of a horse, sent from Mesopotamia by Major Pallin. The subject was a light draught gelding, 15 years of age, and was admitted to hospital suffering from debility; there were symptoms of diabetes. After six weeks' treatment it was decided that the animal should be destroyed. On *post-mortem* examination there was nothing abnormal beyond extreme emaciation, and the calculus (produced) which was found in the kidney. Its weight was 1 lb. 3½ oz. No details were at hand as to the actual position of the calculus in the kidney, but from its shape and appearance, it was apparently lodged in the renal pelvis, with the roughened portion resting against the area cribrosa on the cresta renalis, and the two lateral horns lodged in the processus terminalis. He invited any further explanation.

Capt. A. E. Willett showed an interesting specimen which appeared as a well defined body in the centre of the neck, midway between the mandible and the brisket of a Jersey cow. On palpation it seemed to be an ordinary cyst. It was seen, however, to be a mass of hair, and he thought it was an invaginated portion of skin, and the hair growing into it caused this enlargement.

Major Dunkin exhibited the liver of a 15-months'-old thoroughbred retriever dog. Last December he was called to see it, and it was suffering from distemper. It was very ill for a month, having, among other conditions, double pneumonia. It recovered, and he paid his final visit on December 31st, when the animal seemed quite well. He saw it again on April 13th, when he had a message stating it was off its feed and very thin. He went, and found the dog had an enormous abdomen, which seemed to contain fluid. He postponed puncturing for three or four days, and he then obtained from it two quarts of straw-coloured fluid. On the morning of the puncture the dog was so ill that it could not walk to the car; but immediately after the operation it was much better, jumped into the car and scratched the front door to get home. That evening the speaker was again sent for, and again found the dog in a state of collapse, and it was having what appeared to be epileptiform seizures. He destroyed the dog at midnight, and in the morning he made a *post-mortem* examination. It was not a very good specimen, as, thinking the smell too strong for the meeting room he had it placed in formalin, and his man had made the solution too strong; in the fresh state it had all the appearance of tuberculosis. He hoped to report the pathologist's finding at a future meeting.

There seemed to be also some miliary nodules in the kidneys. As to the cause of the condition, he was present at the dog's birth and could trace its family; its mother was a thoroughbred, and its brothers and sisters were doing extraordinarily well, one brother having taken a championship at Cruft's. This dog had never had raw meat, and the only raw food it had had was milk. There were one or two suspicious cows in the dairy from which the milk came, and the owner of the dog, a lady, was frequently under the doctor, as also was a daughter. If it should turn out to be tuberculosis, he would suspect the milk supply, as the dog had been a great household pet. The dog drank pints of milk a day, and the milk was never boiled. The serous membranes appeared to be clear of tuberculous nodules, but there were commencing changes in the mediastinal glands. The lungs were clear.

Capt. KIRK said that for ten days he had been treating a Pekingese dog, aged two years. He was first called to see it in March, when he found it suffering from constipation and abdominal pain. The abdominal muscles were so very contracted and tense that palpation was impossible. He gave castor oil, and in two days the dog was better. A month elapsed, and on April 24th he was called again, and found the dog suffering from a similar attack. Again, palpation of the abdomen was impossible. It had been suggested that the dog had swallowed a bone, so he suggested an X-ray exposure. The skiagram showed a small dark spot surrounded by a white ring in the centre of the abdominal cavity, which the operator thought might be a washer, a piece of hollow bone, or perhaps a fibrous ring.

After giving 1 grain of morphia, the abdomen became quite flaccid, and palpation of the abdominal contents revealed nothing whatever abnormal. The temperature was never higher than 101°, though the respiration and pulse were at times very rapid. He concluded there was no obstruction, in view of the fact that there was no gaseous distension, no emesis, and the liquid paraffin administered 3 times daily had been passed per anum. The dog lost power in its hind limbs, and later had complete paraplegia. As that frequently followed constipation, he treated the latter, and got a little fæces away, which had a very putrid smell. He gave salol and chloretone in capsule three times daily. The dog was extremely ill and often collapsed; dyspnœa was marked, and the pulse often practically imperceptible; but the temperature never rose. His diagnosis was auto-intoxication from chronic constipation, the unexpelled waste products exerting a predilection for the nervous system, and probably causing the paralysis. He knew in human beings that constipation was the direct cause of acute headaches, and other symptoms of toxic poisoning; but not feeling absolutely self-confident or satisfied, he asked the lady-owner to allow him to get a second opinion, and accordingly Prof. Wooldridge was requested to see the dog. The pulse was in the neighbourhood of 160 or 170, opisthotonos was sometimes present, and morphia had frequently to be given. The Professor thought he could detect spinal meningitis, and suggested the application of counter-irritants to the spine; also that the salol should be continued, combined with pot. brom. and æther. meth. injected hypodermically when indicated. Hot water bottles were in constant use, and an attendant left in charge of the dog throughout each night.

One day whilst examining the dog's heart, as the dog lay asleep in its basket, the speaker noticed Cheyne-Stokes respiration and removed the animal immediately to the table. It then stopped breathing and the pulse was imperceptible. Artificial respiration was applied, and continued from 11-45 until 2 p.m.; ammon. carb. was placed near the nostrils, strychnine given subcutaneously, and two doses (one minim each) of Scheele's prussic acid were placed on the back of the tongue. Meanwhile, an assistant also administered a warm saline enema. At 2 o'clock normal breathing ensued, and the dog slept soundly. He had been giving a pint and a half of warm saline solution per rectum twice daily, and had thoroughly washed the bowel, and removed all hard pellets of fæces and reduced the offensive odour.

Two days later, whilst at a druggists purchasing some pituitrin, he was informed by telephone that the dog had died. He made a *post-mortem* examination and had brought some of the organs for inspection. There appeared to be some slight congestion of the brain, though nothing abnormal was found on the cord. There was slight ulcerative enteritis about the ileo-cæcal valve and rectum, and gastric hæmorrhage around the pylorus, though these conditions were undoubtedly very recent. The dog's temperature was 105° on the morning of the day of death. He asked for suggestions as to the ætiology of the illness.

Mr. W. S. KING showed the skull of a cart-horse which presented a definite horn in the frontal bone. The horse, he understood, came from the States in 1915, and from enquiries he ascertained that it had not been in the Army.

Mr. King also showed a fractured coffin bone of a horse. On the foot being relieved, there was some amelioration of the lameness. He removed a piece of detached bone, and the animal became apparently sound enough for work again. The horse was sent to be shod, but on putting on the shoe he became so lame that he could not put his foot to the ground. After keeping him ten or twelve days, he, on humanitarian considerations, had him destroyed. A complete fracture of the coffin bone could be seen, but there had been no displacement observed.

The exhibitor also showed a navicular bone with erosions; the horse had picked up a nail, but though there was great ulceration there was little lameness.

DISCUSSION ON THE SPECIMENS.

The PRESIDENT said Major Dunkin's case was of much interest to him. The case of a dog having had evident distemper for a long time and that then died and showed lesions of tuberculosis was what he

had seen several times in practice. Dogs with distemper in which there was a previous history of tuberculosis generally fared badly. He thought Major Dunkin was attaching too much importance to the milk as the source of the dog's disease. This seemed to have been a tuberculous house, at least, the members of the household being frequently under the doctor's hands was suspicious; and this source was even more likely in the case of a cat than of a dog. He attributed the infection in this instance to a human source.

With regard to Mr. Willett's case of hair-ball in the neck, he suggested that it might have regurgitated from the stomach and caught in a sacculated œsophagus, and since then had been working its way out to the surface of the neck.

Dr. TURNER said he was not a veterinary surgeon, but a Medical Officer of Health. It was cases such as the Major had brought forward which were most instructive to the Medical Officer. The question of tuberculosis in animals and human beings had been one of discussion for many years, but the rock bottom of the matter had not yet been thrashed out, though many eminent men had written papers on it. The question was, whether animals infected human beings, or *vice versa*. His opinion was that the cat conveyed tuberculosis to the human being. It was a domestic pet, which was very much cuddled by the children. A sensitive child could easily get its lungs infected in this way. A house infected with tubercle through the human members of it was also as likely to convey the disease to domestic animals, especially if they were fondled. The question of tuberculous milk was a very important one; all cows should be periodically examined in each district and tested for the disease. When a cow was found to be diseased the sale of its milk should not be allowed. There were many districts in the country containing dairies whose cows were never examined unless they were offered for sale. From time to time he had to inspect such dairies to see whether they were properly conducted. In one instance a lady's children became seedy from time to time, and he was called upon to inspect the cow-sheds of the dairy from which she had her milk. He went when the purveyor of the milk did not know he was coming. He saw two cows, one a black-and-white, which he thought looked very suspicious, and the other a Jersey, which also looked suspicious. He reported that the dairy was clean and there was nothing the matter with it, and the utensils were regularly cleaned and sterilized. But he said in his report that he was suspicious of two cows, and that he would send a veterinary surgeon to test them for tuberculosis. When the veterinary surgeon went, there were two cows missing. Asked what they were like, it turned out that they were the black-and-white and the Jersey. The cowman was asked about them, and he said they had gone a long time ago. On being told they were there the day before yesterday he was reticent, and would not say where they had gone. He, the speaker, was of the firm opinion that much tuberculosis would be stamped out if a periodical examination of the cows all over the country were made; it should be compulsory in all neighbourhoods in which milk was sold. A large proportion of the milk of London came from Aylesbury, and, if the cows of these dairies were not tuberculosis-free, disease would be carried a long way.

Capt. DUNLOP-MARTIN asked whether, in Major Duncan's case, the whole litter had been under similar feeding conditions and in the same general surroundings.

Major DUNKIN replied that all the puppies were weaned at seven weeks, and were all sold to different owners within a week of that period. This particular dog was the only one of the litter which had had this condition.

Mr. ELMES said he doubted whether the dog's liver, diagnosed as tuberculous, was the seat of that disease. He had a dog in a similar condition some years ago, and it wasted and gradually sank until it died. *Post-mortem*, the liver, when fresh, looked tuberculous; it had nodules. He sent the specimen to the Pathological Research Laboratory, simply asking whether it was human or bovine tuberculosis, feeling so sure it was tubercle. But the report was that it was not tubercle, but that the condition was due to *aspergillus fumigatus*, which affected chickens a good deal.

Major-General Sir JOHN MOORE, after thanking the Society for its welcome, said he thought the calculus in Colonel Moseley's case might probably originate in the Priesz-Nocard bacillus which caused the horrible disease ulcerative cellulitis, which was seen a good deal of in France. He did not know, but Col. Williams might inform them whether such a disease existed in Mesopotamia. In this disease the kidney was much affected, chiefly by abscesses.

He agreed that the dog case was probably tuberculous.

Dr. NIGHBERT informed the meeting that hair cysts were quite commonly met with in cattle practice in the United States. This one, he believed, in examining it, was an open cyst, with the small opening inverted inside. The opening and canal leading inside was probably covered with hair, and as the hair was shed it was gradually pushed inside, thereby filling up the space.

He had been glad to hear of the interest taken by members in tuberculosis in animals. On his side of the Atlantic, the subject was an important one, and was being dealt with in a highly satisfactory way.

Colonel WILLIAMS said ulcerative lymphangitis was one of the things which did not trouble them in Mesopotamia, but there was a lot of epizootic lymphangitis.

With regard to the liver showing tubercular-like lesions, he had seen lesions which macroscopically could not be differentiated from tuberculosis.

In one case in the Soudan a camel dying from a chronic disease, associated with a cough and extreme emaciation, was destroyed, and on *post-mortem* examination extensive tuberculous looking lesions were found resembling the condition known as "Grapes." Material was sent to the Wellcome

Research Laboratories, Gordon College, Khartoum, and examination showed the disease to be botriomycosis.

In another case at Ambala, India, a horse of a cavalry regiment was admitted to hospital with a record showing that it had been treated on several occasions for "debility."

There was general debility, marked wasting of the loin muscles and a "pot-bellied" condition.

The *post-mortem* examination was a very striking one; there were generalised tubercular-like lesions, and the liver weighed about 90 lbs.

A record of this case, with photograph, was published in the *Veterinary Journal* in 1913.

In this case microscopical examinations were carried out at the Pasteur Institute of India, Kasauli, and the Imperial Bacteriological Laboratory, Muktesar, who reported that the lesions were due to a parasitic infection.

Instances of this kind proved the necessity of microscopical examination in all doubtful cases showing lesions resembling tuberculosis.

Lieut.Col. DUNLOP-YOUNG reminded the meeting that Sir John McFadyean stated that the appearances of tubercle were very deceptive; therefore, it was always advisable to have a bacteriological examination made before giving a decision. He welcomed the presence at the meeting of a Medical Officer of Health, and wished there was a closer association between the two professions. There were thousands of cows in this country yielding milk which was neither fit for man nor dog. Not long ago he was in the country in connection with foot-and-mouth disease, and was struck by the insanitary condition of many farms and the unclean appearance of a large number of cows. All herds should be examined at least twice a year, and more attention given to the hygienic production of milk.

Mr. MACDONALD thought the pedal bone shown by Mr. King was fractured at the time of the first lameness without causing displacement; he had known a draft horse recover sufficiently after this accident to work again. In that case the fracture involved the solar and articular surfaces of the bone, being more a crack than a fracture. Death from a ruptured heart resulted about three months after the animal's return to work, and the autopsy revealed the condition of the pedal bone.

Mr. FOREMAN asked whether Capt. Kirk found, in the *post-mortem* examination of the dog, anything to account for the dark patch in the skiagram.

Capt. KIRK replied that the skiagraphist was not sure that it was a foreign body; he said it might have been a fibrous ring around the intestine.

Replying to General Moore, he made *post-mortem* examinations on many horses which had been destroyed in consequence of being affected with ulcerative cellulitis and had known one or two instances where there were multiple abscesses in the liver and kidney; but he had never found a calculus.

With regard to the communicability of tuberculosis from animals to man, and *vice versa*, his father once had 200 head of poultry on his farm, which were all healthy. One day a visitor, who was suffering from tuberculosis, expectorated where the fowls were, and one of them ran up and ate it. He told the visitor he should not do that. In a short time half the stock of fowls had tuberculosis and had to be killed.

Capt. DUNLOP-MARTIN agreed there should be a much closer co-operation between the practitioners of the two branches of medicine—human and veterinary; the benefit would be mutual, and when chatting with Sir John MacAlister, the Secretary of the Royal Society of Medicine, he was very pleased to learn that Major Hobday had been elected to the Council of the Section of Medicine. He congratulated the Major, and the veterinary profession generally, on that fact.

The PRESIDENT asked Mr. King to submit the specimen of the skull to the Zoological Society, where, he felt sure, it would be received with great interest. With regard to a closer working between the medical and veterinary professions, the Central Society had taken the lead in this, and he supported all the good wishes which had been expressed. Their esteemed colleague, Major Hobday, had done very much in that direction, and the veterinary profession could contribute much to the common stock of knowledge. He announced that he had succeeded in prevailing upon the President of the Royal Society of Medicine to give an address to the Society, who, though he was such a busy man, had consented to do so, and he hoped there would be a strong muster on that occasion, to give him a warm welcome. (Applause.)

MEAT INSPECTION CINEMATOGRAPH DEMONSTRATION.

Mr. SQUIRE demonstrated, by a cinematograph film, the process of meat inspection in the United States, under the title "The Little Purple Stamp," the stamp affixed to meat when it had passed all the tests and was certified as fit for human consumption.

Dr. NIGHBERT said the exhibition just given illustrated the practical side of meat inspection in the United States; it was to show the utility phase of inspection of meat and meat food products.

Naturally, the details as to how each step was taken in the inspection work could not be thoroughly covered and explained in a moving picture, in regard to arriving at decisions concerning diseased conditions and dispositions of such carcases, parts of carcases and products.

Only part of the meat in the United States received Government inspection—about 60 per cent. That meant that meat and meat food products wholly prepared and consumed within the various States and not shipped outside those States, received only local inspection by towns and cities, if inspected at all. The law applied to all meat shipped from one State to another State, or exported to foreign countries.

They considered the *ante-mortem* inspection important. This really consisted of two systems; general stockyard inspection for the purpose of detecting general diseases which might involve herds on the farm, or in various localities, and inspection in the

holding pens, which were in connection with the great slaughtering plants, just prior to slaughter.

If an animal or herd showed infectious disease in a general form, slaughtering was not allowed, and if slaughtered, the work was done separately from other animals, or such animals might be held until recovered or otherwise disposed of under government supervision, to assure that meat from such animals was not used for human consumption. When animals were shipped to stockyard markets, inspection reports were made, and if infectious disease was found, it enabled the tracing back to the farm or locality of such disease, when the situation might be properly dealt with under the live-stock sanitary requirements.

All the work was done in a packing and slaughter house by machinery if possible. The viscera here were seen moving before the inspector. The inspector saw and palpated them, and incised the glands to detect disease. The inspectors became very expert at this work. The viscera and the carcase inspections were done by veterinarians.

There were now 850 veterinarians employed in that work, in addition to many skilled lay inspectors. The latter detected gross lesions of disease and supervised the preparation of meat into the finished food product, all under the general supervision of veterinarians. The final inspection of all diseased carcases was done by veterinarians.

With regard to the room for retained and condemned carcases, the final inspection could not be made, as the slaughtering of large herds was taking place, as was the case when things were constantly on the move by machinery, so carcases showing evidence of local or general disease were switched into the retaining or condemned rooms for final examination and disposition.

In the large pork packing houses it was common practice to kill from a thousand to 2,500 animals per day and even more. All found diseased were placed in the retaining or condemned room. Those carcases condemned were placed in a rendering tank and destroyed for the use of food. The rooms where final inspection was made were kept clean and sanitary.

During the war a special law was passed permitting the slaughter of horses for food, and they underwent a similar inspection to that seen in the picture covering other animals. Very little horsemeat was consumed in the United States, except possibly by a certain class of foreigners in their large cities, but a fair amount was exported to European continental countries.

The picture was a fair example of the meat inspection system in the United States, and covered an inspection termed "from the hoof to the can." The inspection of finished pork products, showed examination by the trier, and the sense of smell must be acute to detect sour conditions. If the sour condition was confined to small areas about the bone or joint, the part might be passed for food after the soured area and the bone had been removed and condemned. Those matters were dealt with in a supply of literature, of which a number of copies were in the room.

The moving picture shown there that night was not considered a piece of propaganda—on the contrary, it was made in connection with the market division of their Department of Agriculture, which was appreciated by their trade connection and dealers in their country. It was kind of them and others to show their appreciation by taking the interest they had in that picture.

Lieut.-Col. YOUNG said it was a great pleasure to him to meet their friends, Mr. Squire and Dr. Nighbert, also Dr. Wray, whom he had known many years. It occurred to him that this film would give some idea of the way in which meat inspection should be carried out in this country and all other countries. Only a few years ago there was scarcely any inspection worth calling by that name in this country, and the same was still true in many country districts. Those present would know the provisions of the Departmental Commission which had been sitting on meat inspection. It was hoped that something stringent would be the outcome, which would have the force of law, but that had not yet resulted; the Government was evidently too busy with Irish and Mesopotamian affairs, and apparently it would cost too much money to appoint the necessary additional inspectors. Therefore, the Minister of Health had, in the meantime, to content himself with issuing recommendations. These were certainly a great help, but they had not the force of law. It was recommended that private slaughter-houses should be abolished, but to erect public slaughter-houses at present would be too great an expense. It was also advised that where there were bad private slaughter-houses they should be shut, and the butchers should combine to use the good ones. The butcher should inform the officer in charge of meat inspection when he was going to slaughter, so that he might satisfy himself that animals were not diseased. *Ante-mortem* inspection was very important, especially from the standpoint of contagious disease. The recent outbreak of foot-and-mouth disease had cost the country over a million pounds; but if there had been operative a good system of *ante-mortem* inspection, the disease might have been stamped out at its inception. There was a recommendation that carcases should be inspected and stamped if they were found fit for human food. Such a stamp would prevent the butcher being prosecuted for being in possession of diseased meat, but not if he kept it too long and it became decomposed. This system of meat inspection had been carried out for many years in Argentina, where the largest abattoirs in the world were to be found; he was in one where they slaughtered 2,000 cattle and 5,000 sheep in a day, and the way the meat inspection was carried out made it a work of art. He hoped, on some occasion, to give a resumé of his experience of his visit to the Argentine; at present, with that in view, he was having a series of photographs made into lantern slides.

As to the meat inspection carried out in the United States, there was no American "swank" about it. He had been responsible for meat inspection for thirty

years, and had had much to be with the handling of meat which had come from the United States. He could say, without flattery, that the inspection was carried out as thoroughly as was depicted on the screen, and it was very rare to receive anything from the States with which fault could be found. It was a great pleasure to meet their colleagues from over the water, and he hoped they would profit by one another's company.

Dr. TURNER said that from the public health point of view he had had a most enjoyable evening. The film had indicated very well the work done in America, such work as he regretted was not done in England. The place in which he was Medical Officer only contained 3,400 people, but the work had to be done just the same as in a town of 100,000 people. Up to the present inspection of meat in this country had been badly arranged; it had been "sloppy." One relied on the butcher to call one in to see whether any particular meat was fit for human consumption, and if one thought it was not fit, an order was obtained from the magistrates to condemn it and have it destroyed. Only a few weeks ago the Ministry of Health took the law into its own hands and issued a circular to Authorities, requiring that they should appoint proper inspectors who had passed an examination in the work and thus had credentials to show that they could do meat-inspection thoroughly. Some years ago he asked his Council to provide an abattoir to have the animals slaughtered at one place, for then it would be easier to make a meat-inspection, and the butcher would not have to be relied upon to give a report. He was pleased that these regulations were to come into force, and at the last meeting of his Council he recommended that there should be a public abattoir where meat could be thoroughly inspected and slaughtered and the organs examined. Inspection of meat, both before and after slaughter, was most important.

One thing shown in the film, namely, the smelling of the knife after insertion in the meat, made him think that there should be an expert examination of the Schneiderian membrane of these men in order to find out whether their sense of smell was sufficiently acute.

Capt. BRYDON asked how, if diseased viscera were detected, was the carcase from which they had been removed identified?

Dr. NIGHBERT in reply, said: "The question is important, and I am glad it was asked. With regard to cattle, the floor is divided into 'killing beds,' each being numbered. As the heads are removed, they are placed according to the number of the bed and examined. They are held in this rotation until the inspection of the carcase is made. The carcase moves along to its final 'bed' for skinning and evisceration, which corresponds to the starting point. In this way identification is constantly and correctly kept before the inspector.

"With regard to hog carcases, the inspection consists of two practical principles. First, head inspection at the heading bench. Here an inspector examines the glands by visulation, palpation and incision. If there is anything wrong he marks the carcase for further identification. Second, as the carcase moves along it is eviscerated and the viscera placed before the inspector. If he finds abnormal conditions, the carcase is tagged for final examination and the viscera of the particular carcase side-tracked and also retained. Since all carcases are moving steadily in rotation identification is certain."

Dr. WRAY and Major HOBDAY also took part in the discussion, but owing to the absence of the reporter their remarks were, unfortunately, not recorded.

The PRESIDENT proposed a vote of thanks to Mr. Squire and Dr. Nighbert.

Major HOBDAY seconded.

Major DUNKIN proposed a vote of thanks to Col. Dunlop Young, Capt. E. G. Fairholme and to Mr. Sewell.

Mr. F. W. WILLETT seconded.

Major HOBDAY proposed a vote of thanks to the gentlemen who brought post-mortem specimens.

Col. YOUNG seconded.

The meeting then terminated.

J. F. MACDONALD, *Hon. Sec.*

Notes and News.

The Editor will be glad to receive items of professional interest for these columns.

Foot-and-Mouth Disease.

NUMBER OF ANIMALS SLAUGHTERED.

The Minister of Agriculture (Sir A. Griffith-Boscawen), replying in the House of Commons to Mr. Betterton (Rushcliffe), said the total number of animals slaughtered during the present outbreak of foot-and-mouth disease from January 23rd to May 26th, 1922, were:—Cattle, 23,125; sheep, 20,908; pigs, 9,395; goats, 47. Expressed as a percentage of the total herds in Great Britain, the figures were:—Cattle, 0·35 per cent.; sheep, 0·12 per cent.; pigs, 0·35 per cent.

OUTBREAK IN NOTTINGHAM.

Swine fever and foot-and-mouth disease have broken out at Worksop, Notts., and the cattle market has been closed indefinitely.

INTERNATIONAL HORSE SHOW.

A splendid list of entries, in many classes far above the average in numbers, has been received for the eleventh International Horse Show, which will be held at Olympia, London, from Saturday, June 17th, to Saturday, June 24th, and the directors confidently believe that this will be the most magnificent assemblage of horses on record. Jumping over the course by the best trained horses in the world takes place every afternoon and evening. The building, both as regards scenery and flowers, will be superbly adorned and the band of the Royal Artillery will play. Every evening there will be considerably over 1,000 numbered seats bookable at a shilling each just prior to the performance, and 2,000 at two shillings, which can be booked now, plus tax in both cases.

The Gala Performance is fixed for Monday afternoon, June 19th, when it is hoped that their Majesties the King and Queen will be present to witness the jumping for the King George V. Gold Cup, a trophy now held by Lieut.-Col. Geoffrey Brooke, 16th Lancers.

"Combined Training," the horse on which he won the prize for England for the first time, has again been entered, and, in addition to many other British horses, it is known that officers in the Belgian, Dutch, French, Italian and Spanish armies are arranging to compete.

On the Thursday afternoon teams of three officers from the various armies will compete for the Prince of Wales' Cup, also now held by Britain. The Coaching Club visit the Olympia arena on Wednesday afternoon, and the costers' donkeys will be judged on Thursday evening.

A feature of each performance will be varied and novel riding displays by twenty-five picked men of the Metropolitan Police Mounted Branch Training Establishment. This is by permission of General Sir William Horwood, K.C.B., D.S.O., and will be under the direction of Colonel Percy Laurie, D.S.O. The displays include a wild west show, platting the maypole and trick riding, all going to demonstrate the wonderful training of London policemen.

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

The Plight of Russian Veterinarians.

Sir,—With regard to the appeal on behalf of the Russian veterinary surgeon Constantine Ostapenko, signed by Mr. Bullock and published about two weeks' ago in your esteemed paper, may I be allowed to endorse the statement describing the great need of members of the veterinary profession in Russia.

The "Government of Peasants and Workers" has deprived all people belonging to the so-called "*intelligenzia*" (educated middle-classes) of food rations, thus condemning them to a slow terrible death from starvation.

It happened that I knew Mr. Ostapenko when in Odessa, and I believe that his case is one of real need.

Perhaps this statement of a Britisher and Russian veterinary surgeon, who has recently escaped from Russia, repatriated by the British Government, would help some benevolent members of the veterinary profession in this country to realise how urgent is this particular case and what a noble aim is achieved by sending donations to Mr. Bullock.—I remain, Sir, Yours faithfully, HENRY A. PODGAEZ.

53 South Hill Park, N.W.3., *26th May*, 1922.

Army Veterinary Service.

LONDON GAZETTE. WAR OFFICE. REGULAR FORCES.

May 26th.—Capt. R. H. C. Higgins, M.B.E., retires, receiving a gratuity (May 27th), and is granted the rank of Major.

June 2nd.—Major and Bt. Lieut.-Col. J. J. Aitken, C.M.G., D.S.O., to be acting Lieut.-Col. whilst holding the appointment of Assistant Director of Veterinary Services (July 4th, 1921) (substituted for the notification in the *Gazette* of May 16th).

TERRITORIAL ARMY.

May 30th.—The announcement regarding Capt. W. F. Wilson, which appeared in the *Gazette* of May 16th, is cancelled.

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed. Dogs.	Rabies. Cases Confirmed. Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaught'd as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Week ended 27th May, 1922 ...	...	...	7	8	6	1009	...	...	20	28	1	21	8
Corresponding Week in 1921	...	...	9	10	1	20	...	...	22	25	6	27	6
Corresponding Week in 1920	...	...	3	4	...	...	...	...	53	71	2	50	21
Corresponding Week in 1919	3	...	8	10	...	...	5	5	92	146	1	60	29
Total for 21 weeks, 1922 ...	1	...	267	393	1102	54012	...	...	672	997	404	509	175
Corresponding period in 1921	19	1	253	298	29	2689	5	9	1319	2046	372	516	155
Corresponding period in 1920	4	...	203	238	42	2432	9	16	2366	4070	281	954	334
Corresponding period in 1919	88	3	85	115	19	1033	11	35	2978	5807	212	658	253

NOTE.—The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

IRELAND.									Outbreaks				
Week ended 27th May, 1922 ...		...	...	...	...	...	...	...	...	3	5	25	
Corresponding Week in 1921 ...		...	...	2	5	...	...	...	1	6	27		
Corresponding Week in 1920 ...		...	..	...	...	..	...	1	1	...	...		
Corresponding Week in 1919 ...		...	...	...	...	...	...	2	5	2	2		
Total for 21 weeks, 1922		1	1	...	...	...	...	57	118	125	688		
Corresponding period in 1921 ...		...	...	4	46	...	...	41	131	31	195		
Corresponding period in 1920 ...		1	1	...	...	1	3	65	145	4	16		
Corresponding period in 1919 ...		...	...	...	...	1	1	61	150	18	59		

NOTE.—The figures for the current year are approximate only.

BLACKLEG VACCINES

These vaccines are prepared from weakened cultures of the Bacillus Chauvaei, the specific cause of this disease. They can be supplied as Single Vaccines or as Double Vaccines, and are put up in Cord Form and Powder Form.

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